United States
Environmental Protection
Agency

Office of Public Affairs
Region 4
345 Courtland Street, N.E.
Atlanta, GA 30365

Alabama, Florida, Georgia
Kentucky, Mississippi,
North Carolina,
South Carolina

U.S. EPA Issues a Proposed Plan for Remedial Action at the Carrier Air Conditioning Superfund Site

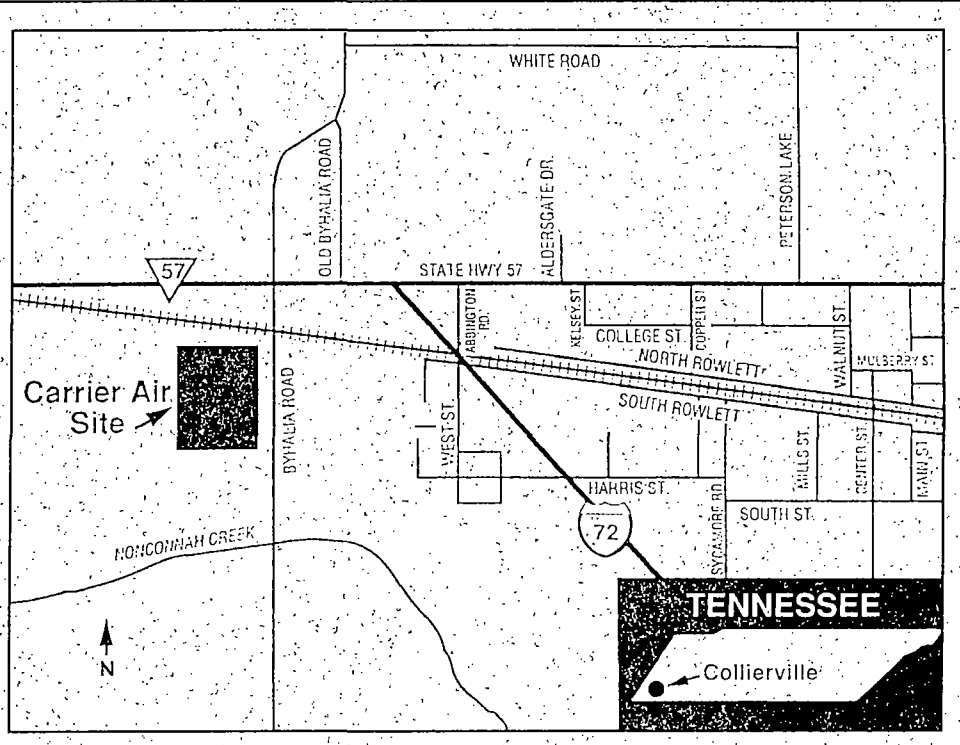
Collierville, Tennessee — April 1992

This fact sheet will provide:

- An overall review of the Site.
- The results of the Remedial Investigation.
- The possible health risks posed by the Site.
- A summary of treatment alternatives.
- A summary of the Feasibility Study.
- Information on EPA's preferred alternative.
- Places to get information.
- Upcoming activities in the remediation and Superfund process.

PUBLIC MEETING

DATE: Thursday, April 30, 1992
TIME: 7:00 p.m.
LOCATION:
Memphis/Shelby County
Public Library
91 Walnut Street
Collierville, Tennessee



INTRODUCTION

This **Proposed Plan** Fact Sheet has been prepared by the U.S. Environmental Protection Agency (EPA) to propose a cleanup plan, referred to as a **preferred alternative**, to address contamination at the Carrier Air Conditioning **Superfund** site (the Site) in Collierville, Tennessee. As the lead agency for oversight of the remedial activities at the Site, EPA has worked in conjunction with the Tennessee Department of Environment and Conservation (TDEC). In its support role, TDEC has reviewed this preferred alternative and concurs with EPA's recommendations. In accordance with Section 117(a) of the **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** of 1980, EPA is publishing this Proposed Plan to provide an opportunity for public review and comment on all the cleanup options, known as **remedial alternatives**, under consideration for the Site.

> **Note:** Words that appear in the glossary on pages 10-11 are in **boldface** print the first time they appear in the body of this fact sheet.

This Proposed Plan highlights key information that is contained in the **Remedial Investigation (RI)** and **Feasibility Study (FS)** reports but does not serve as a substitute for these documents. The RI and FS reports are more complete sources of information regarding the remedial activities at the Site and are

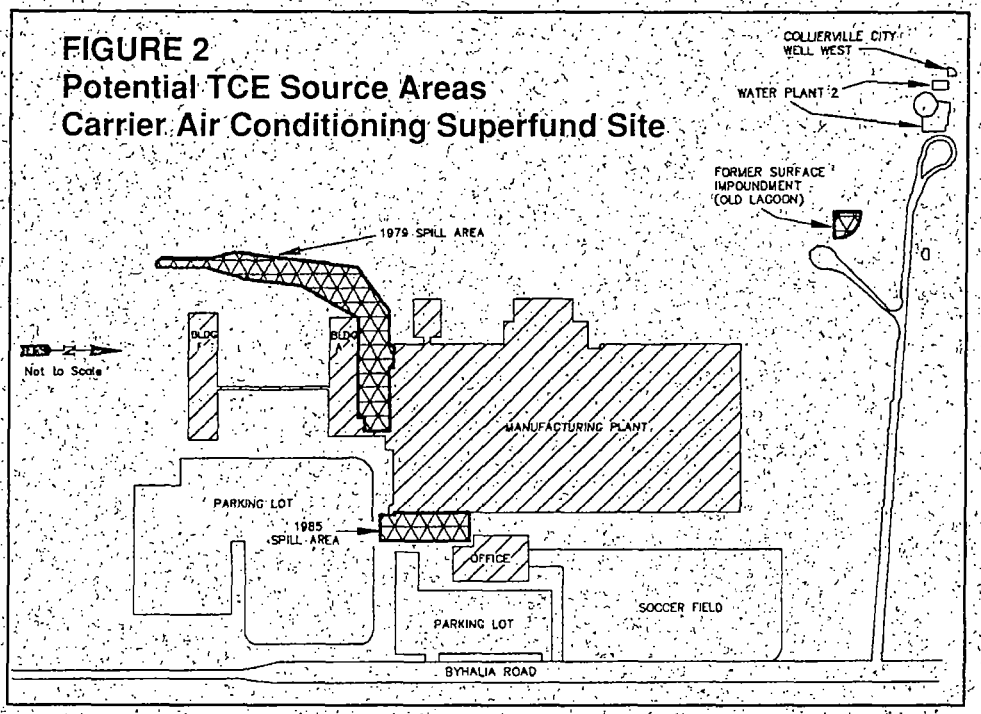
part of the **Administrative Record** for the Site. The Administrative Record consists of technical reports and reference documents used by EPA to compile the Proposed Plan. These documents can be found in the **information repository** located at the Memphis/Shelby County Library, 91 Walnut Street, Collierville, Tennessee.

BACKGROUND INFORMATION

The Carrier site is located on the western side of the Town of Collierville near the intersection of Poplar Avenue and Byhalia Road in Shelby County, Tennessee. The Site consists of approximately 135 acres owned principally by Carrier Corporation (Carrier). In 1967, the town of Collierville purchased the Site property from Robert and Grace Snowden. That same year, the Town of Collierville constructed industrial buildings and purchased industrial equipment for the Site. The property, buildings and equipment were leased to Carrier on March 1, 1967. In 1982, the lease was amended to exclude the northwest portion of the property where the Town of Collierville municipal wells are located. On December 14,1987, Carrier purchased all the property included in the lease with the Town of Collierville. Carrier is the current landowner.

Carrier Corporation operates a residential heating and air conditioning manufacturing facility at the Site. In the process of assembling air conditioning units, aluminum sheeting is stamped and assembled with copper tubing to form air heat exchangers. Stamping and forming oils and dirt are removed from these parts prior to final assembly. **Trichloroethylene (TCE)** was, until recently, the primary solvent used to degrease and clean these parts. Two discrete releases (in 1979 and 1985) of TCE occurred

FIGURE 2
Potential TCE Source Areas
Carrier Air Conditioning Superfund Site



from solvent storage systems to an area just south of the main manufacturing building. In addition, a wastewater lagoon, operated from about 1972 to 1979, apparently accepted waste inadvertently contaminated with TCE and **zinc**.

Removal actions were conducted at the former lagoon and both near-plant spill areas. At the lagoon, approximately one foot of sludge was removed. Asphalt pavement and underlying soils were removed from the parking area affected by the 1979 spill of TCE from a degreaser vent pipe. In 1985, about 500 gallons of TCE from a nearby aboveground storage tank pipe were released. A massive soil excavation and disposal action was conducted to remove the affected soils. As a result of the spill, **monitoring wells** were installed at the facility to monitor groundwater.

Since the 1985 spill, the TDEC continued groundwater monitoring at the Site on a regular basis. In July 1986, one of the **extraction wells** in the Town of Collierville's Water Plant 2 was found to be contaminated with low levels of TCE. Water Plant 2, one of two water plants that supplies residents with water, is on the northwest corner of the Site. Water Plant 1 is in downtown Collierville, one and one-half miles east of the Site. Shortly after testing one of the wells in Water Plant 2, the TDEC tested all the wells in both water plants. Although low levels of TCE were found in both wells of Water Plant 2, no TCE was found in any of the wells in Water Plant 1 or in the treated water from either plant. Operation of the wells and the existing plants has continued under frequent monitoring. In 1990, packed aeration towers, also called air strippers, were installed by Carrier at Water Plant 2 to assure removal of trace amounts of TCE and its natural degradation products from the drinking water supply. The plant remains in continuous service providing up to 1.4 million gallons per day of potable water to the Town of Collierville.

In 1987 and 1988, Carrier conducted an extensive Site investigation under an agreement with the TDEC. Sampling indicated measurable amounts of TCE in the soils and smaller amounts of TCE in the **groundwater** at the Site. The Site investigation also confirmed

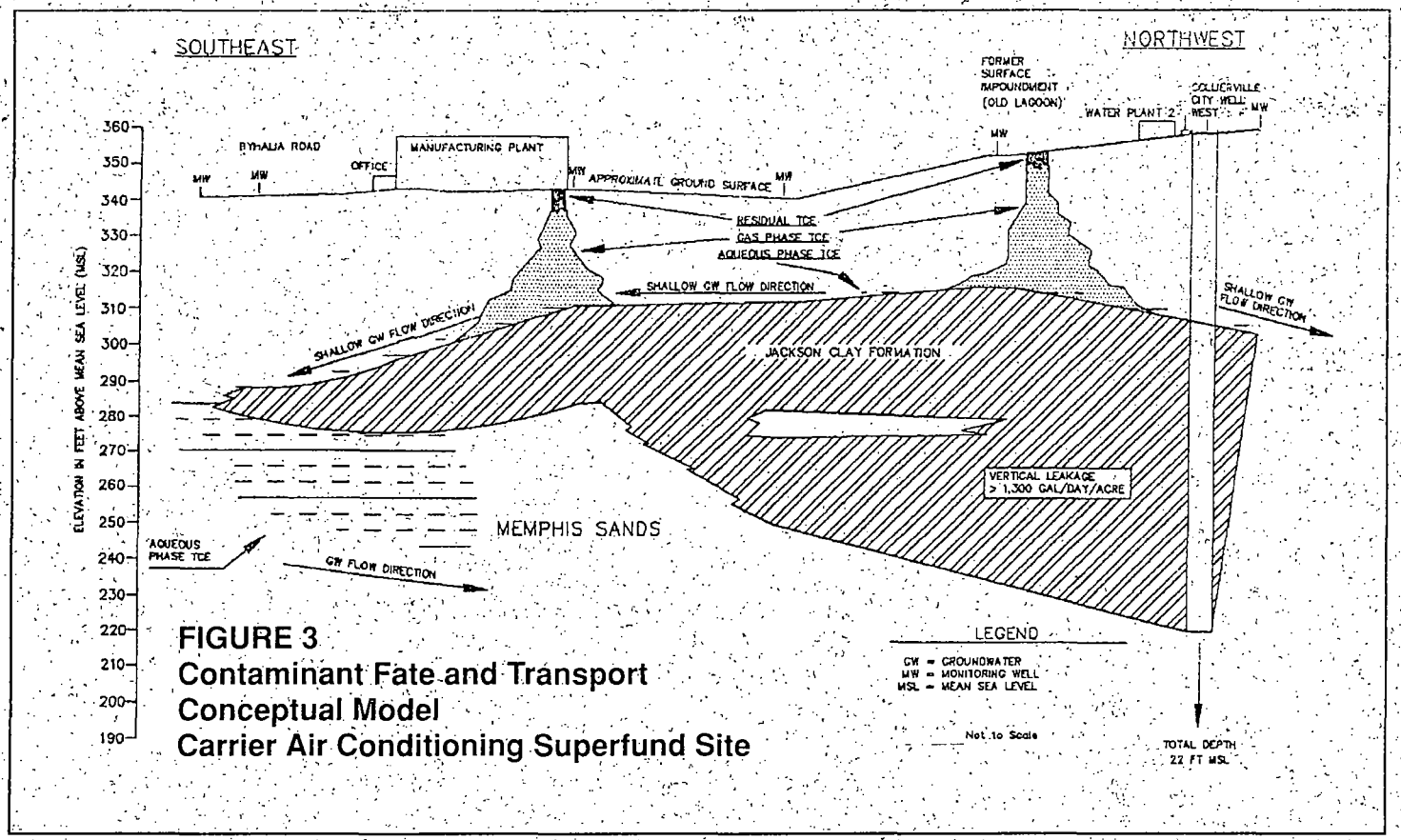


FIGURE 3
Contaminant Fate and Transport Conceptual Model
Carrier Air Conditioning Superfund Site

the earlier finding of low TCE concentrations in the groundwater from Water Plant 2.

In March 1987, the Site was placed on the TDEC's List of Hazardous Substance Sites. In June 1988, it was proposed for inclusion on EPA's **National Priorities List (NPL)**, and became final in 1990. In September 1989, Carrier and EPA signed an agreement called a CERCLA Consent Order under which Carrier would conduct an RI/FS to determine the type and extent of contamination at the Site and identify alternatives for **Remedial Action**. The RI and FS reports were finalized in April 1992.

KEY FINDINGS OF THE REMEDIAL INVESTIGATION

The findings of the RI confirmed the presence of TCE, TCE-degradation products, **lead** and **zinc** in Site soils and groundwater. The two spill areas and the former lagoon area are the sources of contamination (Figure 2).

Soil samples collected within areas suspected to be affected by spills indicate a wide range of primarily TCE contamination levels. The greatest concentrations were from those areas more directly associated with the 1979 degreaser spill. The vertical extent of TCE contamination in the source areas is variable throughout the Site. The former lagoon area may serve as a source of zinc contamination because of the use of zinc phosphate on the Site and the discharge of zinc phosphate sludges to the lagoon.

Upon completion of the RI, a total of 37 groundwater monitoring wells had been constructed onsite. Elevated levels (above **Maximum Contaminant Levels [MCLs]**) consisting primarily of TCE and **1,2-dichloroethylene (DCE)** were found in most monitoring wells. **Vinyl chloride** was not found at a significant frequency, but it has been included as a contaminant of concern because it, like DCE, is a natural degradation product of TCE and has exceeded MCLs. TCE solvent was not a pure product and contained small amounts of **tetrachloroethene (PCE)** and **1,2-dichloroethane (DCA)**. PCE and DCA have not been detected at significant frequencies, but are included as contaminants of concern because they have exceeded MCLs. Elevated levels (above MCLs) of lead and zinc were found in shallow and deep groundwater samples taken onsite.

The following is a list of the contaminants of concern in soils and groundwater:

- Trichloroethylene (TCE)
- 1,2, Dichloroethane (DCA)
- 1,2, Dichloroethylene (DCE)
- Vinyl Chloride
- Tetrachloroethene (PCE)
- Lead
- Zinc

As part of the RI, a **treatability study** was conducted at the former

lagoon area to determine how effective soil vapor extraction would be for onsite soils and shallow groundwater. Soil vapor extraction is discussed later in the Soil Treatment Technology section. The study indicates that this technology is effective in removing contamination in soils and shallow groundwater.

SCOPE AND ROLE OF RESPONSE ACTION

During the RI, a conceptual understanding of the fate and transport of TCE and its degradation products was developed and refined as sampling phases were completed. In general, Site groundwater is found in two systems. The more shallow (40- to 80-foot depth) groundwater is present intermittently and does not serve as a drinking water source. Movement of groundwater, where it occurs, is generally to the south, along the top of a clay confining layer. This layer thins to non-existence at the southern extent of the Site (Figure 3).

A deeper sand aquifer, the Memphis Sands, is recharged regionally from areas to the south and east of the Site. The shallow and the Memphis Sands groundwater combine at the southern extent of the Site. The Memphis Sands is generally a high quality, confined aquifer, with a regional thickness of about 500 feet, and flow direction to the north and west. This aquifer is used as the drinking water source for the Town of Collierville.

Data collected to date indicate that TCE and degradation products migrate from the residuals in soils to the aqueous phase in shallow groundwater. The groundwater slowly moves along the top of the Jackson Clay, primarily toward the southern and western extent of the Site. This contamination moves down to the Memphis Sands in areas where the Jackson Clay unit is absent.

Long-term, the objective remains to prevent exposure by removing the route of exposure (through institutional controls), or the contaminant itself (through treatment), or a combination of the two. Remedial action objectives for groundwater are:

1) Prevent ingestion of groundwater contaminated at or above mandated **Maximum Contaminant Levels (MCLs).**

2) Prevent further contamination of the Memphis Sands.

3) Restore the Memphis Sands aquifer to contamination levels below MCLs.

4) Prevent migration of contaminants from soils that cause the Memphis Sands aquifer groundwater to exceed MCLs.

The remedial alternatives under consideration are summarized in this fact sheet. The FS Report presents a more thorough description and evaluation of these alternatives.

Based on new information or public comments, EPA, in consultation with the TDEC, may modify the preferred alternative or select another response action presented in this Proposed Plan and the FS Report. The public is encouraged to review and comment on all alternatives identified.

SUMMARY OF SITE RISKS

During the RI, an analysis was conducted to estimate the human health or environmental problems that could result if the contamination identified at the Site was not cleaned up. This analysis, known as a **Baseline Risk Assessment**, focused on the potential health effects from long-term direct exposure to the contaminants found at the Site.

EPA has concluded the major risks to human health and the environment at the Site would be ingestion of groundwater in the Memphis Sands aquifer contaminated with TCE and lead. At the present time, because of the continued operation of the existing Town of Collierville Water Plant 2 treatment system, no actual unacceptable exposure is occurring. However, should the Town of Collierville Water Plant 2 treatment system cease operation, or should a future residential well be installed onsite, the existing concentrations of TCE and lead in the Memphis Sands aquifer would exceed EPA's target risk levels.

Several additional pathways were evaluated or considered, but the current or future impacts were found to be within the acceptable risk levels. For example, the shallow groundwater aquifer was not considered a viable pathway due to its low yield. Ingestion and dermal contact with Site soils was considered and these risks did not exceed target risk levels. However, cleanup of Site soils is necessary to address the source of TCE contamination migrating to the Memphis Sands aquifer. Surface water and sediment samples of the Nonconnah Creek were evaluated for possible contaminant impact on the Creek and its inhabitants. The data indicates no adverse impacts from the Site have occurred or are likely to occur in Nonconnah Creek. In addition, the air pathway was not considered to be a viable pathway because a large portion of the contaminated area is paved/covered. The unpaved areas of the Site have insignificant contamination in surface soils and would not contribute to air emissions.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the recommended cleanup plan for the Carrier Air Superfund site is important to EPA. Comments provided by the public are valuable in helping EPA select a cleanup remedy for the Site.

You may use the space below to write your comments, then fold and mail. **Comments must be postmarked by May 21, 1992.** If you have questions about the comment period, please contact Beth Brown at the number listed in the For More Information section on page 10.

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

COMMENT FORM

The public comment period for the **Carrier Air Superfund site** is from **Tuesday, April 21**, to **Thursday, May 21, 1992.**

At the end of the comment period, EPA will review and consider all comments before making a final cleanup decision for the Carrier Air Superfund site. The final cleanup plan for this Site unit, therefore, may be different from the proposed plan.

Fold on dashed lines, staple, stamp, and mail

Name _____

Address _____

City/State/Zip _____

Place Stamp Here

Beth Brown
Remedial Project Manager
U.S. EPA Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

THE FEASIBILITY STUDY: DEVELOPING AND EVALUATING REMEDIAL (CLEANUP) ALTERNATIVES

Technologies Considered in Developing Remedial Alternatives

1) GROUNDWATER TREATMENT

Ultraviolet Light-Enhanced Oxidation

This technology converts organic contaminants in water to a less toxic form using a chemical reaction to increase the oxygen content in the contaminants, thereby reducing the level of many organic contaminants in water. This method is an innovative treatment technology and would require pilot testing to be conducted at the Site.

Air Stripping

Air stripping is a proven technology for removing **Volatile Organic Compounds (VOCs)**. In this process, contaminated water enters either a packed tower or spray chamber and flows downward while air flows upward from the bottom chamber, stripping VOCs from the water. The treated water is collected at the bottom of the tower and is pumped through subsequent processes or is discharged. Air containing VOCs moves to the top of the tower and either exits the tower to the atmosphere or is treated further.

2) SOIL TREATMENT

Soil Vapor Extraction (SVE)

SVE is a proven technology for *in-situ* removal of VOCs from soil. This process consists of applying a vacuum stress to soils (by standard wells or horizontally arranged perforated pipes). By increasing pressure in the soil pore spaces, contaminants are extracted in vapor phase. The air containing VOCs either exits to the atmosphere or is treated further.

Low Temperature Thermal Desorption (LTTD)

Thermal desorption includes a number of different processes that use either direct or indirect heat exchange to increase the temperature of a waste material and volatilize organic contaminants. The volatilized contaminants are treated by an off-gas system. The solids may be destroyed in an afterburner or collected by a physical/chemical treatment system.

3) AIR TREATMENT

Carbon Adsorption

Carbon adsorption is a proven, reliable treatment process for removing a variety of organic compounds. Carbon adsorption involves passing vapors through a chamber that is packed with granular carbon particles. Organic contaminants attach to the carbon, effectively removing contaminants from the vapors.

Low Temperature Thermal Desorption (LTTD)

LTTD involves combustion of VOCs in a fume incinerator. This method is highly effective in the complete destruction of VOCs.

Ultraviolet Photolysis

This technology is similar to groundwater ultraviolet oxidation.

4) DISPOSAL ACTIONS

Groundwater Discharge

Extracted groundwater after treatment will be discharged to: (1) the Town of Collierville water supply, (2) the surface water onsite, (3) the publicly owned treatment works (POTW), or (4) the Memphis Sands by reinjection. All groundwater discharge will be in compliance with ARARs.

Hazardous Waste Disposal

As the contaminated groundwater is treated, used carbon will be removed and collected for proper disposal. Three possible disposal options are landfilling of the waste at an offsite, federally approved hazardous waste facility; incineration of the materials at an offsite federally approved facility; or used carbon regeneration. Under regeneration, the carbon is placed in a high temperature oven that "bakes" off the contaminants. The carbon may then be reused.

Disposal of soils removed from contaminant source areas will remain onsite or will be shipped offsite for disposal. These disposal actions are subject to federal land disposal restrictions and treatment standards.

Summary of Alternatives

The public is encouraged to comment on the preferred alternative as well as the other source and groundwater cleanup alternatives that EPA evaluated. This section summarizes these alternatives, which are presented in greater detail in the FS report.

To avoid redundancy in the summary of each alternative, several specific components common to all remedial alternatives, except for Alternative 1, are listed below:

- The placement of land and water deed restrictions on the Site and in the area.
- Periodic monitoring to assess the effectiveness of the remedy for at least the next 30 years.
- Continued operation of the Town of Collierville's Water Plant 2, which treats the groundwater by air stripping. The need for off-gas treatment with carbon adsorption, thermal, or ultraviolet photolysis will be decided during Remedial Design.
- Continued operation of the soil-vapor extraction (SVE) at the former lagoon, also referred to as the North Remediation System (NRS).
- Extracted groundwater after treatment will be discharged to (1) the Town of Collierville water supply, (2) the surface water onsite, (3) the publicly owned treatment works (POTW), or (4) the Memphis Sands by reinjection.
- Administrative standards, such as air emission limitations, water quality requirements for discharge, and approvals to transport hazardous waste offsite will be met. The need for administrative standards will be determined during Remedial Design (RD).

ALTERNATIVE 1
No Action

CERCLA requires that the "No Action" alternative be considered to serve as a basis against which other alternatives can be compared. Under the No Action alternative, the Site would be left "as is." Periodic monitoring of raw and treated groundwater at the water plant and monitoring wells would be conducted for at least the next 30 years.

The No Action alternative would fail to protect the Memphis Sands aquifer from further contamination and without Water Plant 2's treatment facility in operation, groundwater would exceed MCLs.

ALTERNATIVE 2
North Remediation System (NRS)

Groundwater Containment/ Treatment (at Water Plant 2)

This remedial action provides for SVE at the lagoon area, also referred to as the North Remediation System (NRS), and continued operation of the Town of Collierville's extraction wells, and air stripping at Water Plant 2.

The town wells at Water Plant 2 will continue to operate to provide containment and treatment of the contaminated Memphis Sands groundwater. Some uncertainty exists with respect to the degree of containment provided by operation of Water Plant 2.

Alternative 2 will not be further evaluated because it addresses only soils near the former lagoon area. With no response action directed toward source soils near the manufacturing plant, these will continue to be a significant source of contamination over a period on the order of 2000 years. Without more rapid source control, restoration of the Memphis Sands cannot be accomplished in a timely manner.

ALTERNATIVE 3
North Remediation System (NRS)

SVE (in the Main Plant Area)

Groundwater Containment/ Treatment (at Water Plant 2)

In addition to operation of the NRS, which is soil vapor extraction at the old lagoon area onsite, and groundwater containment/treatment as described in Alternative 2, this alternative addresses the remediation of contaminated soil in the main plant area by SVE.

ALTERNATIVE 4
North Remediation System (NRS)

SVE (in the Main Plant Area)

Groundwater Containment/ Treatment (at Water Plant 2 and with Supplemental Extraction Wells)

Alternative 4 differs from Alternative 3 in that supplemental wells will be installed to provide for containment of contaminated groundwater that is not captured by Water Plant 2. The supplemental extraction wells will also protect the Memphis Sands from further contamination.

Two treatment options for the contaminated groundwater from the supplemental wells were considered under this alternative:

Option 4A: Air Stripping

Option 4B: Ultraviolet (UV)/ Oxidation

ALTERNATIVE 5
Plant Area Soil Excavation

Low Temperature Thermal Desorption (LTTD)

North Remediation System (NRS)

SVE (at Main Plant Area)

Groundwater Containment/ Treatment (at Water Plant 2)

Alternative 5 differs from Alternative 3 in that it introduces excavation and on-site thermal treatment at the main plant area.

The highly contaminated source areas (> 533 ug/kg) will be excavated, where practicable, to an approximate depth of 15 feet and backfilled with clean native soil. Then,

SVE will be used to remediate the deeper contamination where excavation is not possible. The contaminated soil will then be treated with LTTD and remain onsite or be shipped offsite for disposal.

ALTERNATIVE 6

Plant Area Soil Excavation

Low Temperature Thermal Desorption (LTTD)

North Remediation System (NRS)

SVE (at Main Plant Area)

Groundwater Containment/ Treatment (at Water Plant 2 and with Supplemental Wells)

Alternative 6 combines Alternatives 4 and 5. This alternative provides for excavation and onsite thermal treatment at the main plant area, followed by SVE for deeper contamination. Groundwater will be contained by the well field at Water Plant 2 and with supplemental extraction wells. The groundwater treatment options at the supplemental wells are the same as in Alternatives 4A and 4B.

Evaluation of Alternatives

The preferred alternative for the Carrier site is Alternative 4A. Based on current information, this alternative provides the best balance among the nine criteria that EPA uses to evaluate alternatives. These criteria are described on page 9. The Evaluation of Remedial Alternatives table on page 8 provides an analysis and comparison of the alternatives under consideration for the Carrier site based on EPA's evaluation criteria.

The following is additional information regarding two of these criteria, state and community acceptance, that is not fully explained in the evaluation table on page 8.

State Acceptance

The TDEC has assisted EPA in the review of reports and Site evaluations. The State has reviewed and tentatively agrees with the proposed remedy and is awaiting public comment before final concurrence.

Community Acceptance

Community acceptance of the various alternatives will be evaluated during the public comment period and will be described in the **Record of Decision (ROD)** for the Site.

EPA's Proposed Plan for Remedial Action

The preferred alternative, Alternative 4A, utilizes established contaminant removal and treatment techniques for soil and groundwater remediation. Contaminated soil in the old lagoon and main plant areas will be remediated using SVE.

Contaminated groundwater will be removed from the aquifer using the existing extraction wells (at Water Plant 2) and supplemental extraction wells. The combination of these wells will ensure contamination does not migrate offsite and will minimize further contamination of the Memphis Sands aquifer. The contaminated groundwater from the existing town well field will be pumped to Water Plant 2 and treated using air stripping. In addition, the contaminated groundwater from the supplemental extraction wells will be pumped to an air stripper.

The treated water from the extraction wells will be (1) discharged to the municipal water supply; (2) discharged to a local POTW; (3) discharged to surface water; or (4) reinjected to the Memphis Sands aquifer.

Air quality standards will be met using off-gas carbon adsorption, a fume incinerator, or ultraviolet photolysis should monitoring indicate air controls are necessary.

This alternative also includes land and water deed restrictions on the Site and in the area; periodic monitoring to assess the effectiveness of the remedy; and administrative requirements for air emission limitations, water quality discharge or reinjection requirements; and approval for off-site disposal of hazardous waste. The need for administrative standards will be determined during Remedial Design (RD).

Alternative 4A will permanently reduce the risk of exposure to contaminants in soil and groundwater and will also prevent further contamination to the environment.

Summary of Statutory Findings

In summary, the preferred alternative represents the best balance among the criteria used to evaluate remedies. Based on the information currently available, EPA has determined that the preferred alternative would be protective of human health and the environment; would use permanent technologies to the extent practicable; would permanently and significantly reduce volume, toxicity, and mobility; would attain ARARs; and would be cost effective.

EVALUATION OF REMEDIAL ALTERNATIVES								
Evaluation Criteria	1	2	3	4A	4B	5	6A	6B
Overall Protection of Public Health and the Environment	No protection provided.	Limited protection provided.	Will provide overall protection of public health. May not protect the Memphis Sands from further contamination and may not fully protect the environment from off-site groundwater contamination.	Will provide overall protection of human health. Minimizes further contamination of Memphis Sands and will prevent offsite groundwater contamination.	Same as Alternative 4A.	Same as Alternative 3.	Same as Alternative 4A.	Same as Alternative 4A.
Compliance with ARARs (State and Federal Regulations)	Does not comply with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.	Complies with ARARs.
Long-Term Effectiveness and Permanence	Groundwater above MCLs and left uncontained.	Most groundwater above MCLs contained and treated at Water Plant 2. Adequacy of groundwater containment uncertain. Source left untreated	Most groundwater above MCLs contained and treated at Water Plant 2. Adequacy of groundwater containment uncertain.	All groundwater above MCLs contained and treated at Water Plant 2 and supplemental wells. Adequate groundwater containment.	Same as 4A.	Same as 3.	Same as 4A.	Same as 4A.
Reduction of Toxicity, Mobility, or Volume (TMV)	No reduction in TMV.	Soils treated to levels protective of groundwater. Most groundwater treated. Significant residuals.	Soils treated to levels protective of groundwater. Most groundwater treated. Minimal residuals.	Soils treated to levels protective of groundwater. All groundwater treated. Minimal residuals.	Same as 4A.	Same as 3.	Same as 4A.	Same as 4A.
Short-Term Effectiveness	Minimal risk to community and workers. No short-term protection of public health or the environment.	Minimal risk to community and workers. Short-term public health protection provided, but may not contain all groundwater contamination.	Minimal risk to community and workers. Short-term public health protection provided, but may not contain all groundwater contamination.	Minimal risk to community and workers. Short-term public health provided.	Same as 4A.	Physical risks associated with excavation and treatment of contaminated soils. Minimal risks to community and workers. Short-term public health is provided.	Same as 5.	Same as 5.
Time Required to Remediate	~ 2000 years	~ 2000 years	~ 3-5 years soil < 30 years GW	~ 3-5 years soil < 30 years GW	~ 3-5 years soil < 30 years GW	~ 2-3 years soil < 30 years GW	~ 2-3 years soil < 30 years GW	~ 2-3 years soil < 30 years GW
Implementability	Routine monitoring procedures.	Technology readily available.	Technology readily available. Pilot study for SVE at plant area. Somewhat difficult to verify compliance with soil cleanup criteria.	Technology readily available. Pilot study for SVE at plant area. Moderately difficult to verify compliance with soil cleanup criteria.	UV/Oxidation available, but new technology that requires regular bulb replacement. Pilot studies required for plant area SVE and UV/Oxidation. Moderately difficult to verify compliance with soil cleanup criteria.	Same as 4A.	Same as 4A.	Same as 4B.
Present Net Worth Cost (In Millions)	$1.4 - 2.2	$3 - 4 million	$5.7 - 7.5	$5.7 - 7.9	$6.1 - 8.4	$9.5 - 14	$9.8 - $14.5	$10 - 14.9

EPA CRITERIA FOR EVALUATING CLEANUP ALTERNATIVES

Overall protection of public health and environment: Degree to which each alternative eliminates, reduces, or controls threats to public health and environment through treatment, engineering methods, or institutional controls (e.g., deed, land use or other restrictions).

Compliance with State and Federal Requirements: Degree to which each alternative meets environmental regulations determined to be applicable or relevant and appropriate to site conditions.

Short-Term Effectiveness: Length of time needed to implement each alternative and the risks posed to workers and nearby residents during implementation.

Long-Term Effectiveness: Ability to maintain reliable protection after implementation.

Reduction of Mobility, Toxicity, and Volume: Degree to which alternative reduces (1) ability of contaminants to move through the environment, (2) harmful nature of contaminants, and (3) amount of contamination.

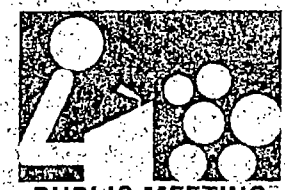
Implementability: Technical feasibility (difficulty of constructing, operating or maintaining) and administrative ease (e.g., amount of coordination with other government agencies or relocation of residents) of implementing remedy, including availability of goods or services.

Cost: Benefits of alternative weighed against cost.

State Acceptance: EPA requests State comments on the Proposed Plan and concurrence on final remedy selection.

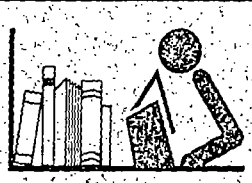
Community Acceptance: EPA holds a public comment period to get input from the affected community and considers and responds to all comments received prior to the final selection of a remedial (long-term cleanup) action.

THE NEXT STEP: THE COMMUNITY'S ROLE IN THE SELECTION PROCESS



EPA solicits input from the community on the cleanup methods proposed for each Superfund response action. **EPA has set a public comment period from April 21 through May 21, 1992, to encourage public comment participation in the selection process.** The comment period includes a public meeting at which EPA will present the RI/FS Report and Proposed Plan, answer questions, and receive both oral and written comments. **The public meeting is scheduled for 7:00 PM, April 30, 1992, and will be held at the Memphis/Shelby County Public Library in Collierville.** Comments will be summarized and responses provided in the Responsiveness Summary section of the ROD, which is the document that presents EPA's final selection for Site cleanup. The public can send written comments to or obtain further information from:

Beth Brown
Remedial Project Manager
U.S. EPA Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365
(404) 347-7791



The Proposed Plan and the RI and FS Reports have been placed in the information repository and Administrative Record for the Site. The Administrative Record includes all documents, such as work plans, data analysis, public comments, transcripts, and other relevant Site material that was used in developing the remedial alternatives for the Carrier site. These documents are available for public review and copying at the following location:

Memphis/Shelby County Public Library
91 Walnut Street
Collierville, Tennessee

TECHNICAL ASSISTANCE GRANTS

EPA is providing communities with the opportunity to apply for Technical Assistance Grants (TAGs). These grants, of up to $50,000 (per site), are designed to enable residents or a community group to hire a technical advisor or consultant to assist them in interpreting and commenting on site findings and the remedial action. There is a limit of one TAG per site. Citizens who are interested in the TAG program may obtain an application package by calling or writing the EPA Community Relations Coordinator listed in this fact sheet on page 10 (see For More Information column).

FOR MORE INFORMATION

The following EPA and TDEC representatives may be contacted for additional information about the Carrier Air Superfund site.

EPA Contacts

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GLOSSARY

Administrative Record: A file that is maintained and contains all information used by the lead agency to make its decision on the selection of a response action under CERCLA. This file is required to be available for public review and a copy is to be established at or near the site, usually at an information repository. A duplicate file is maintained in a central location, such as a regional EPA or State office.

Applicable or Relevant and Appropriate Requirements (ARARs): This term refers to the Federal and State requirements that a remedy the EPA selects must attain. These requirements may vary from site to site.

Aquifer: A geologic formation that contains sufficient permeability to yield significant quantities of groundwater to wells and springs.

Baseline Risk Assessment: An assessment that provides an evaluation of the potential threat to human health and the environment in the absence of no further actions being taken at the site.

Carcinogen: Any substance that causes cancer.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act. This law created a special tax that goes into a trust fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the Superfund program, EPA can either pay for site cleanup when the responsible parties cannot be located or are unwilling or unable to perform the work, or take legal action to force responsible parties to clean up the site or reimburse EPA for the cost of the cleanup.

1,2-Dichloroethane (DCA): A volatile organic compound commonly used as a solvent. DCA is toxic by ingestion, inhalation, and skin contact.

1,2-Dichloroethene (DCE): A volatile organic compound that is known to be toxic when absorbed by skin. DCE is used as a solvent and is also a natural degradation product from TCE.

Extraction Wells: Similar to drinking water wells, but constructed so that large volumes of water can be drawn from below the ground surface.

Feasibility Study (FS): A Feasibility Study (FS) evaluates different remedial alternatives for site cleanup and recommends the alternative that provides the best balance of protectiveness, effectiveness, implementability, and cost.

Groundwater: Water that fills the spaces among soil, sand, rock, and gravel particles beneath the earth's surface. Precipitation, such as rain, reaches the ground and then slowly moves through soil, sand, gravel, and rock into small cracks and crevices below the ground surface. During a process that can take many years, groundwater has the potential of becoming a water source. This water may then be withdrawn from wells for use as drinking water.

GLOSSARY

Hazardous Substances: Any material that poses a threat to public health or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitible, explosive, or chemically active, as defined in CERCLA.

Information Repository: A file containing current information, technical reports and reference documents regrading a Superfund site. The information repository is usually in a public building, such as a public school, city hall, or a library, that is conveniently located for community residents. As the site proceeds through the Superfund remedial process, the file at the information repository is continually updated.

Lead: A naturally occurring element that may be used in manufacturing processes and facility structures. Toxic by ingestion and inhalation of dust or fumes.

Maximum Contaminant Level (MCL): The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards under the Safe Drinking Water Act.

Monitoring: The continued collection of information about the environment that helps gauge the effectiveness of a cleanup action.

Monitoring Wells: Special wells drilled onsite where groundwater can be sampled at selected depths and studied to determine such things as the direction of groundwater flow and the types and amounts of contaminants present.

National Priorities List (NPL): List of sites contaminated with hazardous substances in the United States which are ranked by actual or potential risk to public health and the environment. Placement on this list means that a site qualifies for cleanup assistance under the terms of CERCLA.

Organic Compound: One of the two large classes of chemical compounds, organic and inorganic. It is a term used to describe a chemical containing the element carbon. Examples of organic materials include petroleum products, solvents, oils and pesticides.

Parts Per Billion (ppb): A unit of measurement used to describe levels of contamination. For example, one gallon of a liquid in one billion gallons of water is equal to one part per billion.

Preferred Alternative: EPA's selected best alternative, based on information collected to date, to addresss contamination at a site.

Proposed Plan: A fact sheet summarizing EPA's preferred cleanup strategy for a Superfund site, the rationale for the preference, and a review of the alternatives developed in the RI/FS process.

Record of Decision (ROD): A public document that explains which cleanup alternative will be used at a Superfund site and the reasons for choosing that cleanup alternative over other possibilities.

Remedial Action (RA): The actual construction or implementation phase that follows the remedial design of the selected cleanup alternative at a Superfund site.

Remedial Alternatives: A list of the most technologically feasible alternatives for a cleanup strategy.

Remedial Design (RD): An engineering phase that follows the record of decision when technical drawings and specifications are developed for the subsequent remedial action at a Superfund site.

Remedial Investigation (RI): A Remedial Investigation (RI) examines the nature and extent of contamination problems at a site.

Solvents: Liquids capable of dissolving other liquids or solids to form a solution. The chief uses of industrial solvents are as cleaners and degreasers. Many solvents are flammable and toxic to varying degrees.

Superfund: A term commonly used to describe the Federal program established by CERCLA.

Superfund Amendments and Reauthorization Act (SARA): Amendments to CERCLA enacted on October 17, 1986.

Target Risk: Value system that describes the level of risk associated with a particular contaminant.

Tetrachloroethylene (PCE): A chemical used in dry cleaning, metal degreasing, textile dyeing, and various pesticides. PCE can cause liver and kidney damage.

Treatability Study: A study to evaluate the effectiveness of a technology in remediating contamination.

Trichloroethylene (TCE): A volatile organic compound commonly used as a solvent and degreaser. TCE can be absorbed by humans through inhalation and ingestion, and is associated with kidney and liver damage.

Vinyl Chloride: A volatile organic compound that may be produced from naturally degrading TCE. Studies have shown that vinyl chloride causes cancer.

Volatile Organic Compounds (VOCs): Organic compounds that are characterized by being highly mobile in groundwater and that readily volatilize into the atmosphere.

Zinc: A naturally occurring element used to form a wide variety of alloys including brass, bronze, iron, and various solders. Zinc is not considered a carcinogen.

MAILING LIST
ADDITIONS / CORRECTIONS

If you did not receive this fact sheet in the mail, you are not on the EPA's mailing list for the Carrier Air Conditioning Superfund site. If you would like your name added to the list, please fill out this form, detach and mail to:

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(NAME) (DATE) (NAME) (DATE)

RELEASABLE RELEASABLE

Inside: Carrier Air Conditioning Superfund Site Proposed Plan